FEDERAL - STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

Arizona

By

Division of Irrigation, Soil Conservation Service

United States Department of Agriculture

Data included in this report were obtained by the agency named above in cooperation with the Federal, State and local organizations listed on the last page of this report.

As of

Mar. 15, 1953

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY
AND WATER SUPPLY FORECAST REPORTS:

Forecasts by U. S. Weather Bureau of total annual streamflow October-September, inclusive, at more than 300 gaging stations are issued monthly January through May in the publication WATER SUPPLY FORECASTS FOR THE WESTERN UNITED STATES.

Weather Bureau forecasts of runoff presented in this bulletin are computed from procedures based on mathematical analysis of the relation between precipitation and runoff.

The Weather Bureau bulletins may be secured by writing to:

Hydrologist in Charge
River Forecast Center
U. S. Weather Bureau
712 Federal Office Building
Kansas City 6, Missouri

FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

FOR

ARIZONA

Report Prepared

by

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Division of Irrigation
Soil Conservation Service
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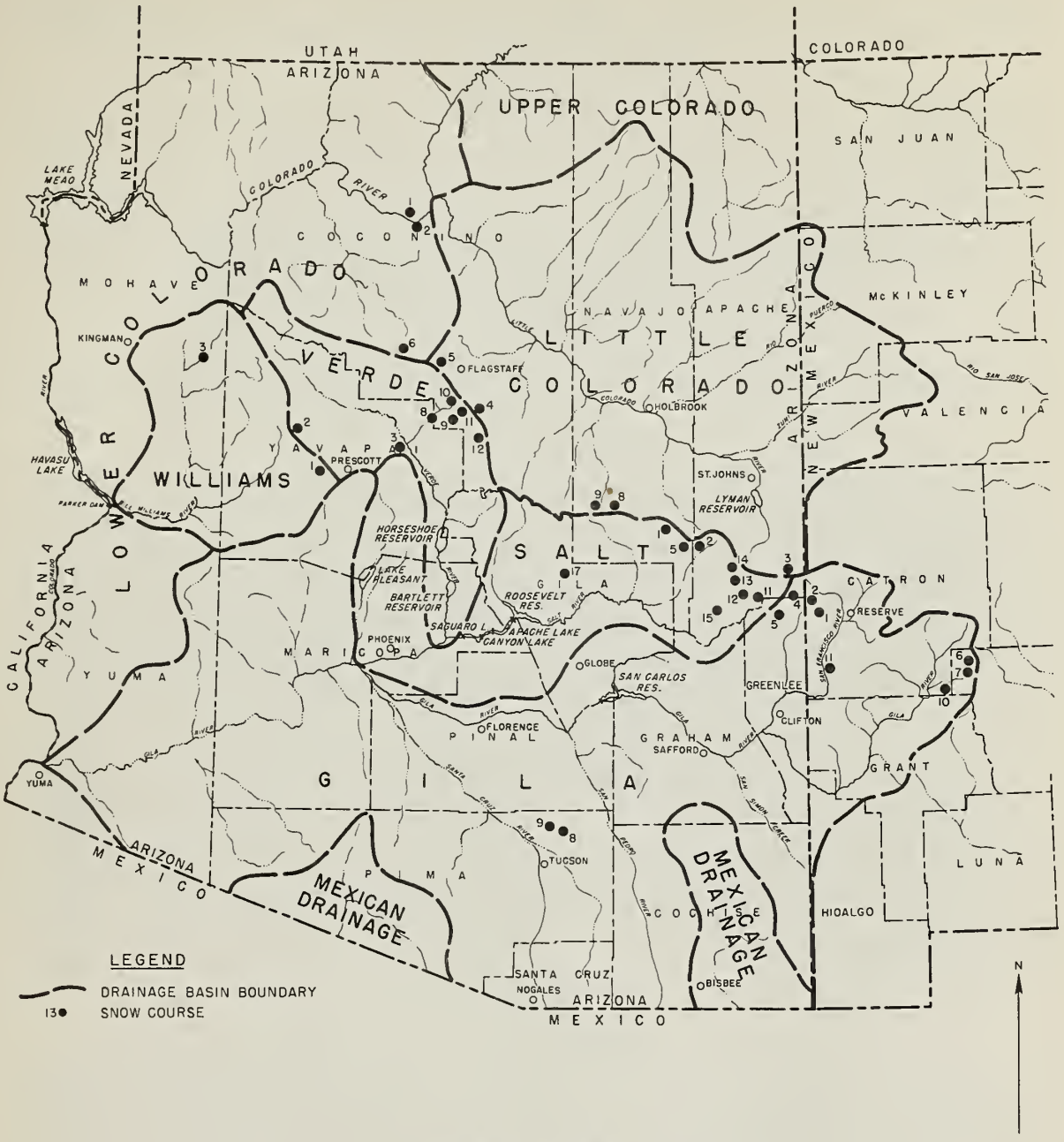

ARIZONA
COOPERATIVE SNOW SURVEYS

SNOW COURSES AND DRAINAGE BASINS
JANUARY 1953

0 40 80 120 160 200
SCALE IN MILES

INDEX TO SNOW COURSES

NUMBER	NAME	ELEVATION
	LITTLE COLORADO RIVER	
1.	Forest Dale	6,000
2.	McNary	7,200
3.	Nutrioso	8,500
4.	Mormon Lake	7,350
5.	Fort Valley	7,350
8.	Heber	7,600
9.	Canyon Creek	7,500
11.	Mormon Mountain	7,500
12.	Happy Jack	7,630
	WILLIAMS RIVER	
1.	Iron Springs	6,200
2.	Camp Wood	5,700
3.	Willow Ranch	5,000
	GILA RIVER	
1.	Frisco Divide (N.M.)	8,000
2.	State Line (N.M.)	8,000
3.	Nutrioso	8,500
4.	Coronado Trail	8,000
5.	Beaver Head	8,000
6.	Taylor Creek (N.M.)	7,850
7.	Inman (N.M.)	7,800
8.	Rose Canyon	7,300
9.	Bear Wallow	8,100
10.	Black Canyon (N.M.)	6,790
11.	Mogollon (N.M.)	7,000
	VERDE RIVER	
1.	Iron Springs	6,200
2.	Camp Wood	5,700
3.	Mingus Mountain	7,100
4.	Morman Lake	7,350
5.	Fort Valley	7,350
6.	Chalender	7,100
8.	Munds Park	6,500
9.	Casner Park	6,930
10.	Antelope Park	7,300
11.	Mormon Mountain	7,500
12.	Happy Jack	7,630
	SALT RIVER	
1.	Forest Dale	6,000
2.	McNary	7,200
3.	Nutrioso	8,500
4.	Coronado Trail	8,000
5.	Milk Ranch	7,000
8.	Heber	7,600
9.	Canyon Creek	7,500
11.	Big Lake Knoll	8,800
12.	Maverick Fork	9,050
13.	Baldy	9,000
14.	Ft. Apache	9,160
15.	Pacheta	7,800
17.	Workman Creek	6,900
	LOWER COLORADO RIVER	
1.	Bright Angel	8,400
2.	Grand Canyon	7,500
5.	Fort Valley	7,350
6.	Chalender	7,100

WATER SUPPLY OUTLOOK

ARIZONA
March 15, 1953

* *
* Snow surveys as of this date show that we have *
* well below normal snow-stored water on all the *
* watersheds of the State. The forecast as of *
* March 1 will not be changed. The next forecast *
* will be April 1. This will be for the period *
* April through May and will be the last forecast *
* of the snow survey season. *
* *

Precipitation, Temperature and Wind Conditions

Precipitation for the first 15 days of March has been 90 percent of normal over the major watersheds of the State. However, the precipitation for the period January through March 15 has been only 55 percent of normal for the major watersheds. Temperatures have been about 3.5 degrees above normal for the January through March 15 period. There have been a number of rather windy days this period with a consequent loss of moisture to evaporation. Daily freezing and thawing is taking snow-stored water through sublimation, although this condition has become less severe. Snow is melting and water is coming off at almost all elevations. The storms the first half of March generally brought rain before and after the snow, even up to and including the 9,000-foot elevations. The Weather Bureau forecast for the 30-day period March 15 through April 15 is for below normal precipitation and a little above normal temperatures.

Snow Cover

Salt River Watershed

Snow-stored water on the Salt River watershed as of this date is about 80 percent of normal. This is due largely to storms the first half of March. Most of this water is above the 8,000-foot level, however, or along the Mogollon Rim. The snow depth varies from 0 at Forestdale, 6 inches at Heber, 12 inches at Workman Creek, and up to 33 inches around the base of Mt. Baldy. Snow-stored water varies from 0 at Forestdale, 2 inches at Heber, 4 inches at Workman Creek and 8 inches around the base of Mt. Baldy. Soil moisture conditions are still very good, but the snow-stored water below 8,000 feet is about gone.

Verde River Watershed

Snow-stored water on the Verde watershed is only about 10 percent of normal as of this date. Mormon Lake, Mormon Mountain and Chalender are the only courses that still have measurable snow. The average snow depth is 1 inch, the average water content is 0.4 inches. The snow-stored water is rapidly moving off this watershed. Soil moisture conditions are generally good, and other than future precipitation, this will be the source of most of the runoff yet to come from the Verde.

Gila River Watershed

Runoff prospects on the Gila are still not good. There is an average of less than 2 inches of snow and less than 1 inch of snow-stored water at the snow courses on the Gila River watershed. This averages about 30 percent of normal. Soil moisture conditions vary from very good on the upper watershed to poor on the lower watershed above San Carlos.

Other Watersheds

Snow-stored water on the Little Colorado is about 27 percent of normal. The Williams River watershed has no snow. The Lower Colorado River watershed has about 26 percent of normal snow-stored water. The Agua Fria watershed has no snow-stored water.

Reservoir Storage

The Salt-Verde reservoir system has about 1,449,000 acre feet of stored water, about 150 percent of normal, and about 70 percent of capacity. This is largely a carryover from last year. This storage system will probably peak during the week of March 22-28. Runoff will probably slow down during this time. Irrigation requirements are beginning to go up and are expected to exceed runoff at some time during this week. For the first 15 days of March the Salt has run 42,000 acre feet, 105 percent of normal, the Verde 12,000 acre feet, 27 percent of normal.

The San Carlos has about 17,000 acre feet, about 7 percent of normal, and only 1,3 percent of capacity.

The Carl Pleasant Reservoir on the Agua Fria has about 82,000 acre feet, about 99 percent of normal and about 46 percent of capacity.

Lake Havasu contains 608,000 acre feet, 103 percent of normal, and 88 percent of capacity. Lake Mohave contains 1,586,000 acre feet, 88 percent of capacity. Lake Mead contains 18,172,000 acre feet, 97 percent of normal, and 65 percent of capacity.

TABLE 1

ARIZONA SNOW SURVEYS MARCH 15, 1953

Drainage Basin and Snow Course	LOCATION No.	Sec.	Twp.	Rge.	Elev.	Date of Survey	Snow Depth (Inches)	SNOW COVER MEASUREMENTS WATER CONTENT(Inches) 1953	1952	1951	PAST RECORD Years of Record	Avg. Water Content (Inches)
LITTLE COLORADO RIVER												
Forest Dale	1	2	9N	21E	6000	3/13	0	0	2.6	0	13	0.5
McNary	2	14	8N	23E	7200	3/13	1.4	0.6	5.4	0	13	1.5
Nutrioso	3	23	6N	30E	8500	3/16	2.1	0.6	3.3	0	13	1.7
Mormon Lake	4	13	18N	8E	7350	3/14	2.0	0.7	11.9	0	6	6.8
Fort Valley	5	22	22N	6E	7350	3/16	0	0	9.1	0	6	3.3
Gentry	7	36	11N	15E	7600	No Report			8.3	T	3	2.8
Heber	8	28	11N	15E	7600	3/13	6.3	1.9	9.3	T	3	3.1
Canyon Creek	9	18	11N	15E	7500	3/13	8.6	3.3	11.6	T	3	3.8
Mormon Mt.	11	14	18N	8E	7500	3/14	4.8	1.9	14.8	4.0	3	5.6
Happy Jack	12	30	17N	9E	7630	3/15	T	0	11.6	0.5	2	6.5
Average							2.8	1.0	8.8	0.5		3.6
GILA RIVER												
Frisco Divide	1	31	6S	20W	8000	3/16	3.7	1.7	2.1	0	13	1.5
State Line	2	6	6S	21W	8000	3/16	1.6	0.5	2.9	0	13	2.3
Nutrioso	3	23	6N	30E	8500	3/16	2.1	0.6	3.3	0	13	1.7
Coronado Trail	4	26	5N	30E	8000	3/16	3.2	1.2	6.7	0	13	3.3
Beaver Head	5	13	4N	30E	8000	3/16	5.1	1.3	7.8	0	13	2.9
Taylor Creek	6	20	10S	10W	7850	3/16	0	0	N.R.	0	10	0.3
Inman	7	6	11S	10W	7800	3/16	0	0	N.R.	0	7	0.4
Rose Canyon	8	15	12S	16E	7300	3/15	0	0	4.0	0	5	1.0
Bear Wallow	9	6	12S	16E	8100	3/15	11.9	4.0	5.2	0	5	2.4
Black Canyon	10	8	13S	11W	6790	3/16	0	0	New Course			
Mogollon	11	2	11S	19W	7000	3/16	0	0	New Course			
Average							2.5	0.8	4.6	0		1.8

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ARIZONA SNOW SURVEYS MARCH 15, 1953

Drainage Basin and Snow Course	LOCATION No.	Sec.	Twp.	Rge.	Elev.	Date of Survey	Snow Depth (Inches)	SNOW SURVEY MEASUREMENTS Water Content (Inches) 1953	1952	1951	Past Record Years of Record	Avg. Water Content (Inches)
WILLIAMS RIVER												
Iron Springs	1	22	14N	3W	6200	3/12	0	0	5.2	0	7	1.3
Camp Wood	2	3	16N	6W	5700	3/15	0	0	3.7	0	7	0.7
Willow Ranch	3	16	21N	11W	5000	No Report			0.5	0	7	0.1
Average							0	0	3.1	0		0.7
SALT RIVER												
Forest Dale	1	2	9N	21E	6000	3/13	0	0	2.6	0	13	0.5
McNary	2	14	8N	23E	7200	3/13	1.4	0.6	5.4	0	13	1.3
Nutrioso	3	23	6N	30E	8500	3/16	2.1	0.6	3.3	0	13	1.7
Coronado Trail	4	26	5N	30E	8000	3/16	3.2	1.2	6.7	0	13	3.3
Milk Ranch	5	28	8N	23E	7000	3/13	0.4	0.2	4.0	0	12	0.8
Gentry	7	36	11N	15E	7600	No Report			8.3	T	3	2.8
Heber	8	28	11N	15E	7600	3/13	6.3	1.9	9.3	T	3	3.1
Canyon Creek	9	18	11N	15E	7500	3/13	8.6	3.3	11.6	T	3	3.9
Maverick Fork	12	13	6N	27E	9050	3/16	22.9	8.0	17.9	N.R.	3	8.5
Baldy	13	28	7N	27E	9000	3/16	25.8	8.4	15.6	4.0	3	7.5
Ft. Apache	14	18	7N	27E	9000	3/16	33.1	7.3	16.8	5.5	3	9.3
Pacheta	15	Town of Maverick			7800	No Report			9.9	0.6	3	3.2
Workman Creek	17	33	6N	14E	5860	3/11	12.0	4.4	9.8	New Course		
Average							10.5	3.3	9.3	0.8		3.7

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ARIZONA SNOW SURVEYS MARCH 15, 1953

Drainage Basin and Snow Course	LOCATION No.	Sec.	Twp.	Rge.	Elev.	Date of Survey	SNOW COVER MEASUREMENTS Snow Depth (Inches)	WATER CONTENT(Inches) 1953	1952	1951	PAST RECORD Years of Record	Avg. Water Content (Inches)
VERDE RIVER												
Iron Springs	1	22	14N	3W	6200	3/12	0	0	5.2	0	7	1.3
Camp Wood	2	3	16N	6W	5700	3/15	0	0	3.7	0	7	0.7
Mingus Mt.	3	3	15N	2E	7100	3/16	T	0	3.3	0	5	1.1
Mormon Lake	4	13	18N	8E	7350	3/14	2.0	0.7	11.9	N.R.	6	6.8
Fort Valley	5	22	22N	6E	7350	3/16	0	0	9.1	T	6	3.3
Chalender	6	27	22N	3E	7100	3/16	0.9	0.3	11.3	1.0	6	4.1
Munds Park	8	7	18N	7E	6500	3/14	0	0	8.0	T	3	2.7
Casner Park	9	19	18N	8E	6930	3/14	0	0	11.0	T	3	3.7
Mormon Mt.	11	14	18N	8E	7500	3/14	4.8	1.9	14.3	4.0	3	6.3
Happy Jack	12	30	17N	9E	7630	3/15	T	0	11.6	0.5	2	6.5
Average							0.8	0.3	9.5	0.5		3.7
LOWER COLORADO RIVER												
Bright Angel	1	34	33N	3E	8400	3/14	20.3	5.4	24.6	6.8	6	12.5
Grand Canyon	2	21	30N	4E	7500	3/15	0.9	0.4	7.3	0	6	2.4
Fort Valley	5	22	22N	6E	7350	3/16	0	0	9.1	T	6	3.4
Chalender	6	27	22N	3E	7100	3/16	0.9	0.3	11.3	1.0	6	4.1
Average							5.5	1.5	13.1	1.9		5.6

TABLE 2

STATUS OF RESERVOIR STORAGE, March 15, 1953

BASIN and STREAM	RESERVOIR	USABLE CAPACITY (1000 A.F.)	THOUSANDS ACRE FEET IN STORAGE ABOUT MARCH 15				
			1953	1952	1951	1950	10 Yr. Avg. 1942-1951
Agua Fria	Lake Pleasant	178	82	128	1	7	39
Colorado	Lake Mohave	1,810	1,586	1,586	1,587	---	----
Colorado	Lake Havasu	688	608	610	628	662	589
Colorado	Lake Mead	27,935	18,172	16,115	17,031	17,961	18,727
Gila	San Carlos	1,285	17	159	0	88	255
Verde	Bartlett	180	47	152	7	70	83
Verde	Horseshoe	143	1	76	1	2	28a
Salt	Roosevelt	1,382	1,047	559	6	311	568
Salt	Apache	245	242	217	159	225	203
Salt	Canyon	58	53	46	52	44	41
Salt	Saguaro	70	59	48	47	44	35

a - Average for years 1946 through 1951

LIST OF SNOW SURVEYORS

SNOW COURSE	SURVEYOR
Forestdale	Chase and Olson
McNary	Chase and Olson
Milk Ranch	Chase and Olson
Casner Park	McNabb and Griner
Munds Park	McNabb and Griner
Mormon Mountain	McNabb and Griner
Mormon Lake	McNabb and Griner
Mingus Mountain	M. F. Jones
Iron Springs	E. Saxby
Camp Wood	Mrs. C. C. Merritt
Willow Ranch	T. Miller
Grand Canyon	C. E. Lehnert
Bright Angel	Valentine & Buss
Fort Valley	A. P. Loska
Chalender	M. C. Oleson
Bear Wallow	Hughes & Brinkley
Rose Canyon	Hughes & Brinkley
Pacheta	Foch Phillips
Maverick Fork	Hatch, Levine and Griner
Baldy	Hatch, Levine and Griner
Fort Apache	Hatch, Levine and Griner
Taylor Creek	F. M. Inman
Inman	F. M. Inman
Coronado Trail	Casanova
Nutrioso	Casanova
Happy Jack	E. Ryberg
Workman Creek	C. L. Moore
Beaverhead	J. Burke
State Line	J. B. Shumate
Frisco Divide	J. B. Shumate
Gentry	Moody & Pattison
Heber	Moody & Pattison
Canyon Creek	Moody & Pattison
Mogollon	J. R. Wray
Black Canyon	E. Van Winkle

The following organizations cooperate in the Arizona snow survey work:

FEDERAL

Department of Agriculture
- Forest Service
  - Apache Forest
  - Coconino Forest
  - Coronado Forest
  - Gila Forest
  - Kaibab Forest
  - Prescott Forest
  - Sitgreaves Forest
  - Southwestern Forest and Range Experiment Station, Fort Valley, Arizona
  - Sierra Ancha Experiment Forest Station
- Soil Conservation Service
  - Division of Irrigation

Department of Commerce
- Weather Bureau
  - Arizona Section

Department of Interior
- Bureau of Reclamation
  - Region III
- Geological Survey
  - Arizona District
- Indian Service
  - Fort Apache Reservation
- National Park Service
  - Grand Canyon National Park

Gila Water Commissioner, Safford, Arizona

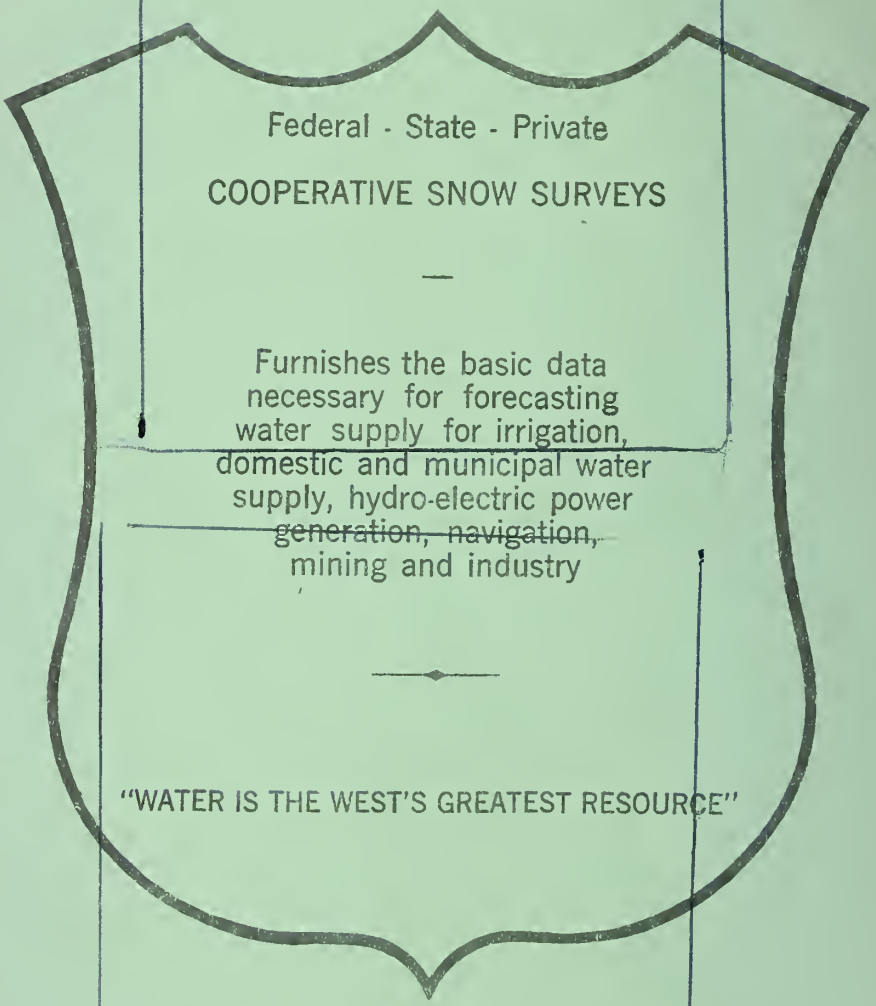
IRRIGATION PROJECTS

Salt River Valley Water Users' Association, Phoenix, Arizona

San Carlos Irrigation and Drainage District, Coolidge, Arizona

SOUTHWEST LUMBER MILLS, INC., McNary, Arizona

Other organizations and individuals furnish valuable information for the snow survey reports. Their co-operation is gratefully acknowledged.


Federal - State - Private
COOPERATIVE SNOW SURVEYS
Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry
"WATER IS THE WEST'S GREATEST RESOURCE"